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MALLOPHAGA FROM BIRDS OF THE HAWAIIAN ISLANDS.

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(Plate X.)

[155] THE Mallophaga (biting lice) identified and described in this paper were collected by Mr Richard C. MacGregor from birds shot and identified by himself in the Hawaiian Islands, and constitute the first collection of insects of this order made in the islands. The collection includes twenty species of parasites taken from twelve species of birds. Of these twenty species fourteen are here named and described as new, four are named and described as varieties of previously known species, while but two can be considered typical representatives of already known species. Of the twelve bird species composing the list of hosts, four are species peculiar to the Hawaiian Islands, and the parasites of these hosts are all new species except the two taken from the Hawaiian coot, *Fulica alai*.

The collection is too small and the new species in it altogether too strongly in the majority, to make profitable any attempt to compare the Mallophaga of Hawaii with those of other regions.

The occurrence of *Lipeurus docophoroides*, the typical parasite of the California partridges, on the introduced Indian "minha" is interesting, but is probably explained by the ground-feeding habits of the "minha" and the introduction into Hawaii of the partridges. Interesting also and not so readily explicable is the occurrence of *Oncophorus adena*, a characteristic parasite of coots and found in the Hawaiian coot, on the forest inhabiting honey-sucker, *Vestiaria coccinea*.

The following is a list of the papers by Kellogg (as sole or joint author) constantly referred to in the following pages by abbreviated titles.

New Mallophaga, 1; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. IV. 1896.

New Mallophaga, II; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. VII. 1896.

New Mallophaga, III; Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Junior University, No. XIX. 1899.

¹ Reprinted, by permission, from the Journal of the New York Entomological Society, Sept. 1902, pp. 155—169, Pls. xiii, xiv, xv. The digits in square brackets give the original pagination.

A List of the Biting Lice (Mallophaga) taken from Birds and Mammals of North America, Proc. U. S. Nat. Mus., vol. xxii. pp. 39—100, 1899.

[156] Mallophaga from Birds of the Galapagos Islands, Proc. Wash. Acad. Sci., Vol. iv. pp. 457—499, 1902, Pls. xxviii—xxxii.

Mallophaga from Birds of the Pacific Coast of North America, Jour. New York Ent. Soc., vol. x. pp. 20—28, 1902.

The nomenclature of the host birds used in this paper is that adopted by Bryan in his Key to the Birds of the Hawaiian Group (1901, Bishop Museum, Honolulu).

DOCOPHORUS.

(1) *Docophorus communis*, Nitzsch.

Docophorus communis Germar, Mag. für Ent., III. p. 290, 1818; Kellogg, List of N. A. Mallophaga, p. 50, 1899.

From *Carpodacus mexicanus obscurus* (Pun Olai, Maui Island), and *Munia nisoria*.

(2) *Docophorus macgregori* [sp. nov.].

♀. Body, length 1.45 mm.; width, .53 mm.; head dark chestnut-brown, body uncoloured with distinct triangular lateral blotches; genital blotch showing through body. Plate X. fig. 1.

Head, length .5 mm.; width .48 mm.; triangular, forehead tapering and clypeal front narrow and slightly concave, with two short hairs on the lateral margin, one longer hair rising in front of the sutures, and one short prickle at the suture; trabeculae prominent, nearly as long as the first two segments of the antennae, deep chestnut-brown at the base, with uncoloured tip; eye indistinct with one long hair, and near the posterior margin a second long hair; temples rounding, with four long hairs, the three in the temporal angle are pustulated, occipital margin weakly convex; ground colour of head chestnut-brown, signature distinct, anterior margin deeply concave, with a slight lateral constriction near the anterior angles, lateral margins rapidly diverging, forming sharp posterior angles, the posterior margin extending backward in a long, acute angle beyond the mandibles; antennal bands interrupted at the suture, dark chestnut-brown, the posterior extremities bending inward and back, meeting the dark brown occipital bands; temples an even rich chestnut-brown.

Prothorax small, lateral margins slightly diverging; lateral blotches dark chestnut-brown, separated by a broad light medium line; lateral margins blackish. Metathorax with strongly divergent lateral margins, angulated on abdomen, with distinct lateral blotches separated medially by an uncoloured line, with a series of long pustulated hairs along the posterior margin. Sternal markings of dark chestnut-brown, intercoxal lines showing through the surface. Legs pale chestnut-brown, darkening slightly on anterior margins.

Abdomen ovate, widening gradually to segment 4 and rounding rapidly to segment 9, lateral angles rounding with one to three long hairs; many long, pustulated, dorsal hairs in a transverse series in the posterior margin of each segment; lateral transverse triangular blotches dark chestnut-brown, darkening slightly on the lateral margin; the posterior margin interrupted by the uncoloured pustulations; median portion of the abdomen uncoloured; segment 8 entirely brown; segment 9 narrowly emarginate, a few short prickles on the posterior margin; genital blotches distinctly dark brown, broadly rounding on segment 5 and rapidly tapering to sharp angle on segment 8; two distinct pustulations in the lateral angles on segment 6.

[157] ♂. Body, length 1.33 mm.; width, .5 mm.; head, length .5 mm.; width .48 mm.; abdomen broadly ovate, last segment flatly rounding, with very long hair in the lateral angles; segments 6—9 entirely chestnut-brown.

Specimens from *Chlorodrepanis virens* (Kahului, Maui Island, and Iao Valley¹, Maui Island).

(3) *Docophorus fuliginosus hawaiiensis* [var. nov.].

Docophorus fuliginosus hawaiiensis Kellogg, New Mallophaga, 1. 1896, p. 80, Pl. iii, fig. 2; List of Mallophaga, 1899, p. 47.

Measurements of male, body length 1.6 mm., width .75 mm., head length .6 mm., width .6 mm., abdomen broadly ovate to subcircular, distinctly turbinate, strongly coloured, showing but little light uncoloured median region, segments 1—6 with series of strong pustulations.

Many specimens from *Charadrius dominicus fulvus* (Kahului, Maui Island) and from *Heteractitis incanus* (Hito [? Hilo], Hawaii Island) may be referred to the species *fuliginosus*, but they show well-marked varietal differences.

NIRMUS.

(1) *Nirmus minhaensis* [sp. nov.].

♀. Body length 1.83 mm., width .46 mm., pale golden brown.

Plate X. fig. 2.

Head, length .65 mm.; width .38 mm.; narrowly elongate, conical, with the clypeal margin broadly rounding; its uncoloured clypeal region expanding in front of the suture; seven hairs on the margin of forehead, two of which are longer than others and arise dorsally; antennae with second segment longest, and segment 5 longer than segments 3 or 4; eye not prominent, with one hair, temples with sides nearly parallel, one long pustulated hair in the broadly rounded temporal angle and three short prickles on the margin; occipital margin slightly concave, without hairs or prickles; general

¹ "Iao Valley" in the original. D. S.

colour of the head pale golden brown, clypeal signature pale brown but distinct, narrowing slightly posteriorly; anterior and posterior margins slightly convex; antennal bands broad anteriorly but little darker than general colour of the head, deepening to black-brown at the antennal fossae; ocular blotch distinct, black-brown; temporal borders narrow but well marked until interrupted by the pustulation, broader just below the eye; occipital blotches distinct.

Prothorax short, sides parallel; posterior angle with one long pustulated hair; general colour pale brown with whitish median line and narrow dark lateral bands. Metathorax with broad rounding sides, diverging posteriorly; one long hair in the posterior angle; posterior margin with a long, acute, median angle; lateral submarginal band, widening near the anterior angle and again in front of the posterior angle. Legs pale golden brown without dark markings.

Abdomen narrow, elliptical; broadening rapidly to segment 4; posterior angle distinct, with 1—2 long hairs; broad transverse band of pale brown separated by a distinct uncoloured median line extending to segment 6, bands shining in segments 6 and 7; lateral bands dark golden brown, broader anteriorly; posterior margins of segments uncoloured; last segment broadly rounding with a slight emargination.

One specimen from *Acridotheres tristis* (Hahaina [? Lahaina], Maui Island).

[158]

(2) *Nirmus stenozonus* [sp. nov.].

♀. Body, length 2 mm.; width .4 mm.; long, slender, pale yellow brown with distinct blackish marginal markings on the abdomen.

Plate X. fig. 3.

Head, length .4 mm.; width .36 mm.; elongate, conical with a very narrow, slightly convex anterior margin, two short marginal hairs near the front; a long weak hair in front of the trabeculae which reach as far as the second segment of the antennae; antennae with second segment longest, segment 5 longer than segments 3 or 4, colour pale yellow brown; eyes inconspicuous, with a short prickle near the posterior margin; temporal margins flat with one long pustulated hair and a few short prickles; ground colour of head yellow brown with golden brown antennal band, bending sharply in at the antennae; anterior margins separated by an uncoloured clypeus; temples bordered with narrow band of dark chestnut-brown; a pale brown shield-shaped occipital blotch surrounded by a V-shaped uncoloured marking extending from the dark-coloured mandibles to the occipital margin.

Prothorax short with rounding lateral margins; one hair in the rounding posterior angles; pale golden brown lateral borders; metathorax trapezoidal with widely diverging sides (posterior angles extending beyond the lateral margin of the abdomen), a few short prickles and one long hair in the posterior angles, posterior margin slightly rounding on the abdomen; chestnut-brown marginal markings, paling anteriorly after the constriction;

no distinct sternal markings. Legs pale yellow brown, concolorous with the body, with darker marginal markings.

Abdomen very long and slender with subparallel sides; abdominal segments gradually widening to segment 6, segment 7 slightly narrower and abruptly tapering with segment 8; two hairs in the posterior angles; segment 8 broadly rounding with slight emargination; pale yellowish-brown with blackish-brown linear bands on the lateral margins of segments 1—7; last segments without dark markings.

Two females from *Munia nisoria* and *Vestiaria coccinea* (Hilo, Hawaii Island). The specimen is much like *ductilis* but shows distinct abdominal blotches.

(3) *Nirmus diaprepes* [sp. nov.].

♀. Body, length 1.55 mm.; width .53 mm.; white, with dark brown to black marginal bands, brown median abdominal markings.

Plate X, fig. 4.

Head, length .46 mm.; width .4 mm.; conical, front slightly concave, with five marginal hairs placed equidistant in front of the trabeculae, a few dorsal hairs extending beyond the margin; trabeculae large, uncoloured; antennae uncoloured, segment 2 longest, 3 and 4 about equal; segment 5 as long as both segments 3 and 4; eye inconspicuous with short prickle; temporal margins slightly rounding with one, long, weak, pustulated hair in the angle, two short prickles on lateral margin behind the eye; posterior margin straight, with two stiff bristles near the lateral angle; ground colour of the head yellowish-white, clypeus uncoloured, antennal bands rather broader than other body markings, black fading inwardly, distinct interruption in front of the trabeculae; ocular blotch distinct, black, meeting the temporal bands which grow narrow at the temporal angles and disappear on the occipital margin; the mandibles chestnut-brown, a shield-shaped occipital signature chestnut-brown, darker in narrow anterior angle.

[159] Prothorax quadrangular, with flatly rounding sides, posterior angles rounded with one hair; dark brown marginal border; intercoxal lines of sternum showing through. Metathorax with widely diverging sides; posterior angles extending beyond the first segments of the abdomen; a series of long pustulated hairs along the broadly acute posterior margin; dark brown blotch in the anterior angles; black brown blotches in posterior angles, fading inwardly to a narrow brown band remote from the posterior margin which is pale golden brown. Legs palest golden brown, femora and tibiae with dorsal marginal black markings with a blackish-brown annulation near the distal extremity, a few short stiff hairs.

Abdomen elongate ovate, sides subparallel; segments 1 to 4 rapidly widening; lateral angle acute with from one to three long weak hairs; narrow black brown marginal markings on segments 1 to 8; segment 8 with pale brown submarginal band passing in an elongate curve across the segment broadening on the median line;

segment 9 uncoloured, deeply emarginate, with one short prickle and one long hair each side of the emargination; segments 2—8 with a broad median blotch separated from the lateral border by a broad uncoloured band.

♂. Body, length 1.25 mm.; width .46 mm.; head, length .38 mm.; width .38 mm.; last abdominal segment protruding, narrowly rounded with several long hairs each side of the middle of the posterior margin, segment 8 narrow, with small pale blotch near lateral margins, segments 8—9 with broad continuous median blotches: genitalia composed of narrow bars, showing through segments 6—9.

Male and female from *Vestiaria coccinea* (Hilo, Hawaii Island).

(4) *Nirmus orarius hawaiiensis* [var. nov.].

Nirmus orarius hawaiiensis Kellogg, New Mallophaga, 1. 1896, p. 104, Pl. v. fig. 5; List of Mallophaga, 1899, p. 55.

♀. Body, length 1.5 mm.; width .38 mm.; head, length .25 mm.; width .26 mm.

♂. Body, length 1.3 mm.; width .33 mm.; head, length .4 mm.; width .26 mm.; head not so elongate as in *orarius*, clypeus not extending so far laterally, colour of head translucent with distinct occipital signature, abdomen with distinctly darker brown transverse bands.

Several specimens from *Charadrius dominicus fulvus* and *Fulica alai* (Kahului, Maui Island) can be referred to this species, but differ in such degree as to make them entitled to varietal rank.

(5) *Nirmus gloriosus emarginatus* [var. nov.].

Nirmus gloriosus emarginatus Kellogg and Kuwana, Mallophaga from Birds of the Galapagos Ids., Proc. Wash. Acad. Sci., vol. iv. 1902, pp. 457—499, fig. 1, Pl. xxix.

♀. Body, length 1.9 mm.; width .38 mm.; head, length .43 mm.; width .26 mm.

♂. Body, length 1.6 mm.; width .33 mm.; head, length .41 mm.; width .25 mm.; clypeus with distinct emargination, general colour paler chestnut-brown.

Several specimens from *Anous stolidus* (Kahului, Maui Island) can be referred to this species but must have a varietal name.

LIPURUS.

(1) *Lipurus docophoroides minhaensis* [var. nov.].

Lipurus docophoroides minhaensis Piaget, Les Pediculines, 1895, p. 357, Pl. xxviii. fig. 9; Kellogg, List of Mallophaga, 1899, p. 63.

[160] ♀. Body, length 2 mm.; width 1.05 mm.; head, length .58 mm.; width .5 mm.

One female from *Acridotheres tristis* (Lahaina, Maui Island) which shows such a disproportionate width of body when compared with typical specimens of the species that it must be considered the type of a variety.

ONCOPHORUS.

(1) *Oncophorus advena* Kellogg.

Oncophorus advena Kellogg, New Mallophaga, 1. 1896, p. 130, Pl. xi. figs. 1—2 ;
List of Mallophaga, 1899, p. 66.

From *Fulica alai* (Kahului, Maui Island), *Vestiaria coccinea* and *Heteractitis incanus* (Hilo, Hawaii Island). This parasite is normal on the coot (*Fulica*), but is a wholly unexpected find on the honey-creeper (*Vestiaria*).

GONIOCOTES.

(1) *Goniocotes chinensis* [sp. nov.].

Goniocotes chinensis ♀. Body, length 2·35 mm.; width ·96 mm.; whole body translucent with dark golden brown marginal markings on thorax and posterior margin of head, but paling distinctly on the abdomen.

Plate X. fig. 5.

Head, length ·65 mm.; width ·85 mm.; front broadly rounding with several short weak hairs on margin in front of the antennae, which are long and pale in colour, the first segment longer than the second and the third and fourth subequal and together about as long as the second segment; eye flatly rounding with one short spine near the posterior angle; temporal margins sharply diverging, meeting the occipital margin in an acute angle, with two long hairs and one short spine on a sharp angular projection of the temporal margin beyond the real angle of the temples.

An acute angle each side of the median angle of the occipital margin, each with a short prickle; ground colour of the head pale translucent yellow with a narrow band of darker yellow on the rounded front. These bands fade slightly inwardly, and in front of the antennae turn in and darken distinctly into golden brown, fading towards the mandibles which are also dark chestnut-brown; distinct chestnut-brown blotch in front of the eye, the temples with distinct yellow marginal bands; occipital margin dark chestnut-brown, fading inwardly.

Prothorax narrow, sides slightly diverging, posterior angles not prominent, with one long weak hair, dark golden brown lateral bands and the sternal markings showing through as broad golden brown bands, bending in and back and meeting in a broad sternal shield on the metathorax narrow, indistinct; a long hair in each lateral angle; dark golden brown lateral bands paling inwardly. Legs pale with slightly darker marginal band and few weak hairs; front pair very short and weak, second pair little stronger.

Abdomen obovate, widening gradually to segment 4 and broadly rounding to the last segment; one to three hairs in the posterior margins, growing longer on the posterior segments; last segment rounding with narrow deep median emargination; a few long and short hairs on the margin; ground colour translucent pale yellow, lateral bands of darker yellow, growing paler after segment 1, resembling somewhat a series of vertebrae, last segment without distinct markings.

From *Turtur chinensis* (Kahului, Maui Island).

COLPOCEPHALUM.

[161] (1) *Colpocephalum kilaucensis* [sp. nov.].

Colpocephalum kilaucensis ♀. Body, length 1.55 mm.; width .5 mm.; elongate, pale golden brown with dark chestnut-brown markings on the head and thorax, and paler brown marginal border on the abdomen.

Plate X. fig. 6.

Head, length .36 mm.; width .4 mm.; front flatly rounding with a slight median angulation, palpi and antennae barely projecting beyond the head; one short hair each side of the median line, one long stiff hair and one stiff bristle each side of the front (not like *timidum*) on the rounding anterior angle, a single stiff hair just back of a slight lateral depression, and one very long and three shorter hairs and two short prickles on the lateral margin just in front of the ocular depression; eye with a slight but distinct emargination; ocular fringe distinct; temples broad with flatly convex lateral margins, with a few white hairs, and three longer hairs; occipital margin broadly concave, with four hairs pale golden brown with small dark brown ocular blotches and black ocular flecks; pale brown clypeal blotches; dark brown of mandibles showing through the head; temples without marginal markings.

Prothorax with a short spine and long stiff hair in the sharp lateral angles, one long hair on lateral margin; series of hairs on the narrowly rounded posterior margin; ground colour darker brown than head or abdomen and sternal markings showing through. Metathorax with rounding angles, sides slightly diverging and showing a slight emargination where the mesothorax and metathorax have fused; a hair and a stiff bristle and one prickle in the posterior angle; ground colour golden brown, anterior angles bordered with dark brown, lateral margins bordered narrowly with brown; this band leaves the margin and cuts off the posterior angles. Legs the paler brown of body; femora thickened and many stiff hairs.

Abdomen elongate oval; posterior angles of segments not projecting; a few short hairs on the lateral margin, growing longer on the segments 6 and 8; numerous non-pustulated hairs scattered irregularly over the dorsal surface, last segment slightly convex with a series of short hairs along the posterior margin, two rather long hairs on

the lateral margin, and one very long hair each side of the median line; body colour pale fuscous, and uncoloured longitudinal line running parallel with the lateral margins on segments 1—8; outside of the line on each segment a dark fuscous blotch, showing darker triangular transverse blotches on segments 1—7; last segment uncoloured, with pale transverse blotches fading inwardly.

Specimens from *Heteractites incanus* (Hilo, Hawaii Island). This species resembles *timidum* closely except in size and a few minor details.

(2) *Colpocephalum epiphanes* [sp. nov.].

Colpocephalum epiphanes ♀. Body, length 2 mm.; width .63 mm.; long and slender, dark fuscous brown.

Plate X. fig. 7.

Head, length .36 mm.; width .5 mm.; front flatly rounded; six hairs on the front; sides of front slightly diverging with seven marginal hairs, the four just in front of the ocular emargination strong and stiff; ocular emargination deep and narrow, with a prominent ocular fringe; eye large with distinct emargination and black ocular fleck; antennae projecting slightly beyond the margin of the head; temples widely projecting, narrowing rapidly posteriorly; three very long hairs, a few shorter hairs and several [162] bristles on the rounding temporal margins; occipital margin broadly concave, bare; pale fuscous with dark brown clypeal blotches barely separated from the dark ocular blotches; temples narrowly bordered with dark brown deepening to black on the broad occipital band, fading anteriorly to meet the ocular blotches, mandibles dark, showing through the head.

Prothorax narrow, short, a spine and long hair in each obtuse lateral angle; one long hair on the lateral margin and a third long hair in the latero-posterior angles; posterior margin broadly convex; colour dark fuscous with narrow lateral line of dark brown. Latero-posterior angles with dark brown blotch; two small dark triangular dorsal blotches each side of the median line (sternal markings). Metathorax bell-shaped, a few prickles on the lateral margins; posterior angle with four short spines and two long stiff hairs; colour dark fuscous deepening in the posterior angles; a distinct pale suture between the meso- and metathorax, with a slight lateral angular emargination and an uncoloured median line across the mesothorax. Sternal marking consisting of distinct shield-shaped blotch of clear brown, the lateral angles being dark brown on the prothorax; a broad metathoracic blotch with dark intercoxal borders. Legs long, fore femora greatly thickened, some stiff hairs; concolorous with head, narrow dark marginal markings.

Abdomen elongate oval with a series of short prickles along the lateral margins of the segments; after segment 5 one or two hairs in the posterior angles of segments, these angles not extending enough to break the regular elliptical margin of the abdomen;

colour dark fuscous with black lateral border, broader on the first segments of abdomen, diminishing to a narrow line on the anterior half of the last segment; a pale longitudinal line running parallel with the lateral margin; each segment with a broad median transverse band separated by a pale line from the other segments; dorsal surface thickly scattered with short hairs; last segment narrowly rounding with long hairs on the lateral margin and fringe of fine short hairs along the posterior margin; a pale uncoloured line on the posterior margin with large pustulations in the anterior ends of clear region.

Three females taken from *Anous stolidus* (Kahului, Maui Island).

(3) *Colpocephalum brachysomum* [sp. nov.].

Colpocephalum brachysomum ♀. Body, length 1.33 mm.; width .7 mm.; short, broad, pale fulvous with dark brown to black markings on head.

Plate X. fig. 8.

Head, length .36 mm.; width .6 mm.; front flatly rounding, a short weak hair each side of the median line, a second weak hair on the lateral margin of the front; two long and two short hairs on the lateral angle in front of the ocular emargination; antennae projecting beyond the margin by its last segment; eye large, distinctly divided, the larger anterior portion filling the angle of the ocular emargination, while the posterior portion lies apparently on a ridge which extends across the temples, a distinct black fleck in the larger portion of the eye; few stiff hairs in the ocular fringe, growing more irregular in length on the anterior portion of the prominent, rounding temples, one of these hairs very long, a few shorter hairs on the posterior margin; occipital margin weakly concave, with a long hair and short spine each side of the median line; colour pale yellowish-brown; large ocular dark chestnut-brown blotches extending laterally by the black ocular fleck; dark brown clypeal blotches extending inwardly to the dark mandibles; occipital band distinct, widening into deep ruddy brown angular occipital blotches, which fade anteriorly.

[163] Prothorax broad anteriorly, angles with one long hair and a short spine; a short spine and one long hair on the broadly rounding lateral margin; colour yellow brown with no distinct markings. Metathorax narrow with abruptly diverging sides; a series of short stiff spines along the lateral margin. A number of long hairs in the rounding posterior angles; posterior margin straight with a series of long hairs; pale brown with darker brown angular lateral blotches. Legs robust, pale brown with darker marginal bands; a number of short stiff hairs on the outer margin of the tibia.

Abdomen broadly elliptical, the lateral margins broken by slightly projecting posterior angles of the segments; many long and short stiff hairs along the lateral margins and a series of stiff hairs along the posterior margins of each segment, the hairs longer on the posterior segments; ground colour pale yellow brown, growing paler

posteriorly; darker brown lateral bands on all segments save the last, these lateral bands interrupted interiorly by a pale line parallel with the lateral margins, last segment broadly rounded, pale yellow to uncoloured posterior margin; a few long weak hairs on the margin and a series of short weak submarginal hairs.

Specimens from *Asio accipitrinus* (Jao Valley, Maui Island), and from *Caradrius dominicus fulvus* (Kahului, Maui Island).

(4) *Colpocephalum conspicuum* [sp. nov.].

Colpocephalum conspicuum ♀. Body, length 1.28 mm.; width .55 mm.; weakly coloured, pale fuscous with conspicuous dark golden brown markings on the head, thorax and abdomen.

Plate X. fig. 9.

Head, length .25 mm.; width .4 mm.; front with slight median angle, one short weak hair each side of the front; a slight angle in front of the palpi; two long stiff hairs on the slight elevation in front of the ocular emargination, three stiff hairs from the ventral surface extending beyond the margin; eye large, slightly flattened with a black ocular blotch; ocular fringe distinct with few stiff hairs; temples broad with flatly convex lateral margins bearing several hairs of various lengths, two being pustulated; occipital margins broadly concave with one long hair, one short hair and one prickle each side of the median line, ground colour pale fuscous with narrow dark brown ocular border, meeting the paler clypeal blotches; mandibles dark brown; a pale brown rectangular signature showing through the head.

Prothorax; anterior margin broadly convex; antero-lateral angles obtuse, a strong angle on the lateral margin with one strong hair; three long hairs on each lateral half of the rounded posterior margin; ground colour darker fuscous than head, dark brown sternal markings showing through. Metathorax pentagonal, the mesothorax and metathorax distinctly separated; sides of the metathorax diverging, one long hair and three spines in the posterior angle, posterior margin with a series of long hairs; colour dark fuscous on the prothorax, darker on the mesothorax, dark chitinous band of coxae showing through as a marginal border of the anterior angles; sternal markings dark intercoxal, lines consisting of a distinct wedge-shaped marking on the prosternum, pale fuscous bordered posteriorly with a narrow dark band, and an indefinite blotch on the metasternum tapering to a dark acute posterior angle. Legs concolorous with the body with small brown markings.

Abdomen elongate, elliptical, broadest on segment 5; posterior angles of segments slightly extending each with one long hair and a spine in the angle; a series of irregular hairs on the posterior margin of segments, growing thinner medially; last segment abruptly narrower than segment 8, posterior margin rounding with a fringe of fine [164] uncoloured hairs; pale fuscous with distinctly darker lateral bands darker on the posterior and inner margin; a slight suggestion of transverse bands on segments 3—6.

♂. Body, length 1.13 mm.; width .41 mm.; darker colouring of abdomen, more dorsal and ventral hairs, segment 8 longer than segments 3—7; a distinct uncoloured line in the posterior margin of segment 7; genitalia strongly chitinized, conspicuous, extending through segments 2—9; last segment rounding with two long hairs and several short hairs on the margin.

Many specimens from *Carpodacus mexicanus obscurus* (Kahului and Pau (?) Olai, Maui Island).

(5) *Colpocephalum discrepans* [sp. nov.].

Colpocephalum discrepans ♀. Body, length 1.21 mm.; width .68 mm.; golden brown with dark chestnut ocular blotches, occipital bands and darker lateral bands on the abdomen; unusually short and rounded for a *Colpocephalum*.

Plate X. fig. 10.

Head, length .38 mm.; width .58 mm.; front flatly rounded, with a short hair each side of the median line; a few on the margin in front of the antennae which extend beyond the head by the full length of the last segment; one very long hair and two shorter ones in front of the ocular emargination; emargination deep and acutely angular; eye large, nearly divided, with a conspicuous black fleck in the larger anterior part; ocular fringe distinct and with few graduated hairs; temples gradually widening to the rounding posterior angles; many hairs of irregular length on the anterior half of the temples; two very long and a few short hairs and spines in the posterior angle; occipital margin concave with a long hair and a short spine each side of the median line; colour of the head golden brown, with large ocular blotches and triangular occipital blotches of dark blackish-brown connected by a band of paler brown; an even band of dark brown connects the triangular occipital blotches; a dark brown blotch each side of the clypeus in front of the antennae connected with the dark mandibles and the ocular blotches by a pale brown blotch.

Prothorax short and strong, anterior angles with a long hair and short spine in the angle; pustulated hairs along the rounding lateral posterior margin; same golden brown colour as head, transverse chitin band distinct with a short dorsal hair at the outer ends of bar; dark chitin bars extending back from the anterior margin across the prothorax. Metathorax short, appearing like the first segment of the abdomen; sides rapidly diverging; two short spines and a long hair in the posterior angles; a series of strong pustulated hairs along the straight posterior margin; median portion of the segment golden brown, the posterior angles with a broad triangular band of darker brown. Legs pale golden brown with darker blotches at the joints and a narrow marginal band of dark brown.

Abdomen broadly ovate, short hairs and spines on the lateral margins and a long hair in the posterior angle of each segment; a series of long pustulated hairs along the

posterior margin of the segments; last segment broad, rounded with a few strong hairs in the margin. Colour dark golden brown with darker brown lateral blotches.

♂. Body, length 1 mm.; width .1 mm.; head, length .33 mm.; width .55 mm.; shorter than the female; abdomen with segments 5—7 narrowed distinctly in the middle; genitalia extending forward to segment 1 (seeming even to go into the metathorax).

[165] A single specimen from *Carpodacus mexicanus obscurus* and from *Anous stolidus* (Kahului, Maui Island).

MENOPON.

(1) *Menopon hawaiiensis* [sp. nov.].

♀. Body, length 1 mm.; width .6 mm.; being thus unusually broad and short for the *Menopon* type; fuscous, translucent, with no well defined markings except the black ocular flecks and the intercoxal lines which show through the body.

Plate X, fig. 11.

Head, length .21 mm.; width .51 mm.; broad and short; a slight angulation in front, on each side of which a very short hair and one longer hair; palpi with a long terminal segment extending slightly beyond the rounding front; two long strong hairs and two shorter weaker hairs on the rounding angle in front of the ocular emargination; the emargination is slight but distinct; eye large, nearly divided by a large ocular fleck; ocular fringe with few spines; temples projecting narrowly, with four hairs on the rounding margin, two of which are very long, a few short prickles and a few shorter hairs arising on the dorsal surface; occipital margin broadly concave, a long hair on each side of the median line; colour of head pale fuscous, a darker band across the front deepening where the palpi and mandibles show through the head, ocular band darkening anteriorly; occipital margin narrowly bordered with pale brown; on the under side of the head there are two strongly chitinized backward-projecting, pointed processes, arising from the labium, and these show through the head giving the impression of dark occipital bands.

Prothorax short, with a very long hair and two prickles in the obtuse anterior angle, a series of four long pustulated hairs and four prickles on each side of the rounding lateral and posterior margin; the transverse chitin bar distinctly pale brown, intercoxal lines showing through distinctly. Mesothorax narrow with posterior angles sharp, with a long hair and two spines in the angle, chitinous bars extending longitudinally from the anterior angles across the segment. Metathorax narrow, appearing like the first abdominal segment, a dark chitinous bar extending from the anterior lateral margin of the mesothorax back across the metathorax cutting off the posterior angles; a series of short hairs along the posterior margin; sternal markings consisting of small triangular median blotch with narrow chitinous bars arising laterally and

extending forward and outward to the anterior angles of the prothorax ; dark curving intercoxal bands on the mesothorax ; legs translucent, fuscous with distinct brown margins.

Abdomen broadly ovate, posterior angles obtuse and slightly projecting with a short spine and from one to two long hairs in the angle ; a series of hairs along the posterior margin of each segment ; entire abdomen a darker fuscous than the head or thorax, a narrow transverse band of darker brown across each segment ; last segment broadly rounded with a series of hairs along the posterior margin.

. One female from *Chlorodrepanis virens* (Iao Valley, Maui Island).

(2) *Menopon cyrtostigmum* [sp. nov.].

♂. Body, length 1 mm. ; width .46 mm. ; short, broad ; golden brown, darker on abdomen, black brown ocular bands with many stiff spines on body.

Plate X. fig. 12.

Head, length .26 mm. ; width .4 mm. ; front broadly and evenly rounding with two short hairs near the median line, a weak hair in front of the slightly projecting palpi ; one short hair at the suture ; two long and one shorter pustulated hairs in front [166] of the distinct ocular emargination ; eye inconspicuous but with a distinct black fleck ; ocular fringe distinct, composed of stiff curving hairs which extend slightly on the temporal margin ; temples rounding, narrowing posteriorly with five long pustulated hairs and two short spines on the margin ; occipital margin broadly concave with one short hair near the outer angle ; colour of the head pale fuscous with narrow dark chestnut-brown ocular blotches and black ocular flecks ; dark markings on front of head showing through from palpi and mandibles ; occipital margin with narrow band of dark chestnut-brown, darkening slightly at the occipital blotches.

Prothorax short, anterior angles projecting but little with a long hair and two short prickles in each ; a series of six hairs on the broadly rounding posterior margin ; colour darker brown than the head, wedge-shaped blotch and dark intercoxal bars showing through distinctly from the sternum. Mesothorax distinctly separate from the metathorax by a series of short spines. Metathorax long, little broader than the prothorax ; side slightly divergent with one short spine on the lateral margin ; three short spines and one long hair in each posterior angle ; a series of weak hairs on the posterior margin ; colour chestnut-brown, lighter than the prothorax, darker in the anterior angles, and a narrow band along the lateral margins, legs robust, of the palest fuscous colour of the head, with darker band and semi-annular rings ; many short stiff hairs on the front of the femora and tibia.

Abdomen broadly elliptical ; small as compared with the large head and thorax ; a few short stiff spines in the posterior angle of the segments, with a long hair in angles of segments 2—8. A series of long stiff hairs on the posterior margin of each segment ;

each segment with a pale transverse band, darkening on the posterior margin, and the lateral margin interrupted by a narrow uncoloured submarginal band parallel with the lateral margins of the abdomen; last segment broadly rounding, without dark markings, with two long hairs and a short spine on the lateral margin; genitalia dark brown, extending forward into segment 5 and showing through the body distinctly.

♀. Body, length 1.16 mm.; width .26 mm.; head, length .33 mm.; width .38 mm.; much paler in colour than male, only showing dark markings on the head.

Specimens from *Vestiaria coccinea*, *Himatione sanguinea* (Hilo, Hawaii Island) and *Chlorodrepanis virens* (Iao Valley, Maui Island).

(3) *Menopon hilensis* [sp. nov.].

♀. Body, length .91 mm.; width .48 mm.; short, broad, pale fuscous without well-defined markings.

Plate X. fig. 13.

Head, length .21 mm.; width .4 mm.; front broadly rounding with two short hairs each side of the front; one very long and one shorter hair in front of the ocular emargination; ocular emargination distinct but shallow; eye large, quite filling the angle, distinctly cleft with a large ocular fleck and two stiff prickles, protruding with one very long hair and two shorter hairs, several spines and prickles on the rounding margin; one long and two short spines on the dorsal surface each side of occipital margin, which is slightly concave with a spine and one long hair each end side of the median line; a second long hair on the outer angle of the occipital margin and the temple; colour of head pale fuscous, narrow dark band on the front broadening into a blotch each side of the clypeus; with dark black-brown ocular bands, and narrow triangular occipital blotches meeting in the median line and extending along the posterior margin of the temples.

[167] Prothorax wide, anterior angles round with a short spine; six long pustulated hairs and a spine on the rounding lateral posterior margin; a dorsal prickle at each end of the distinct transverse chitin bar; colour fuscous. Metathorax with slightly diverging sides with three strong marginal spines, two long hairs and prickles in the posterior angles; a series of weak hairs and one spine along the posterior margin; colour dull fuscous. Legs concolorous with the body, with darker marginal markings.

Abdomen broadly ovate, with a long hair, a shorter hair and a prickle in the posterior angle of the segments; a series of weak hairs along the posterior margin; last segment narrow, with a series of hairs on the posterior margin which has a slight median angulation; colour fuscous, slightly darker on the posterior margin of the segment, a pale band on the posterior margin of segment 6, segment 7 deeper fuscous than other segments.

One specimen from *Vestiaria coccinea* (Hilo, Hawaii Island).

(4) *Menopon invadens* [sp. nov.].

♀. Body, length 1.75 mm.; width .66 mm.; pale, clear, yellowish-brown, slightly darker thorax, indistinct lateral bands on the abdomen.

Plate X. fig. 14.

Head, length .35 mm.; width .53 mm.; front flatly convex, with two short stiff hairs at the median line; one long and one shorter marginal hairs on the angle in front of the antennae; two long and two shorter hairs on the distinct swelling in front of the ocular emargination; eye large, distinctly emarginate with a large black ocular fleck; a long stiff hair on the dorsal surface near the margin; ocular fringe distinct, composed of a few stiff curving hairs; temples rounding narrowly but without angles; three very long pustulated hairs, two shorter hairs and a few short prickles on the margin; two long pustulated hairs on the occipital margin; ground colour clear yellowish-brown with darker brown blotches at base of the antennae; dark brown mandibles shining through the head; a narrow dark brown ocular band, widening anteriorly, and a narrow occipital band of dark brown.

Prothorax short; anterior angles with two spines and one long hair; posterior margin broadly rounding with two long hairs near the lateral margin and two long hairs each side of the median line; whole segment darker brown than the head, with a distinct transverse chitin bar. Metathorax and mesothorax long, being separated by a distinct suture, mesothorax distinctly darker brown than the metathorax, lateral margins diverging with few short spines and one long hair in its posterior angles; posterior margin straight with four long marginal hairs; dark intercoxal chitin bar showing through. Legs large, weakly coloured, translucent dorsal marginal bands on femora and tibiae; anterior coxae with bluntly triangular black blotches; many short spines and a few long hairs.

Abdomen elongate, elliptical; a series of short stiff spines and one to two long weak hairs in the lateral angles and a series of long hairs on the posterior margins of each segment; segments 7 and 8 with two long hairs in the posterior angles; last segment with two long hairs each side of the posterior margin, ground colour pale, clear yellowish-brown; indistinct lateral band growing darker from segment 2 to segment 7; narrow, pale brown transverse bands; many scattered hairs on the ventral surface and groups of strong spines, besides the series of stiff spines near the lateral angles.

Specimens from *Acridotheres tristis* (Lahaina, Maui Island and Kahului, Maui Island), and *Turtur chinensis* (Kahului, Maui Island).

[168]

LIST OF HOSTS, WITH PARASITES.

ANOUS STOLIDUS.

Nirmus gloriosus emarginatus Kellogg & Chapman.

Colpocephalum epiphanes Kellogg & Chapman.

Colpocephalum discrepans Kellogg & Chapman.

*FULICA ALAI.**Nirmus orarius hawaiiensis* Kellogg & Chapman.*Oncophorus advena* Kellogg.*HETERACTITIS INCANUS.**Docophorus fuliginosus hawaiiensis* Kellogg & Chapman.*Oncophorus advena* Kellogg.*Colpocephalum kilaucensis* Kellogg & Chapman.*CHARADRIUS DOMINICUS FULVUS.**Docophorus fuliginosus hawaiiensis* Kellogg & Chapman.*Nirmus orarius hawaiiensis* Kellogg & Chapman.*Colpocephalum brachysomum* Kellogg & Chapman.*TURTUR CHINENSIS.**Goniocotes chinensis* Kellogg & Chapman.*Menopon invadens* Kellogg & Chapman.*ASIO ACCIPITIRINUS.**Colpocephalum brachysomum* Kellogg & Chapman.*ACRIDOTHERES TRISTIS.**Nirmus minhaensis* Kellogg & Chapman.*Lipeurus docophoroides minhaensis* Kellogg & Chapman.*Menopon invadens* Kellogg & Chapman.*CARPODACUS MEXICANUS OBSCURUS.**Docophorus communis* Nitzsch.*Colpocephalum discrepans* Kellogg & Chapman.*Colpocephalum conspiciuum* Kellogg & Chapman.*MUNIA NISORIA.**Docophorus communis* Nitzsch.*Nirmus stenozonus* Kellogg & Chapman.*VESTIARIA COCCINEA.**Nirmus stenozonus* Kellogg & Chapman.*Nirmus diaprepes* Kellogg & Chapman.*Oncophorus advena* Kellogg.*Menopon cyrtostigmum* Kellogg & Chapman.*Menopon hilensis* Kellogg & Chapman.*HIMATIONE SANGUINEA.**Menopon cyrtostigmum* Kellogg & Chapman.*CHLORODREPANIS VIRENS.**Docophorus macgregori* Kellogg & Chapman.*Menopon cyrtostigmum* Kellogg & Chapman.*Menopon hawaiiensis* Kellogg & Chapman.